Experiment 1c - Setup an IGP (IS-IS)

DE-CIX Academy

Version 1.4

1 Purpose

An IGP (Interior Gateway Protocol) distributes the interface IP addresses within an Autonomous System. This is needed so iBGP can connect. The advantage of IS-IS is that it runs directly on layer 2 (Ethernet) and is able to distribute both IPv4 and IPv6 addresses.

2 Network Setup

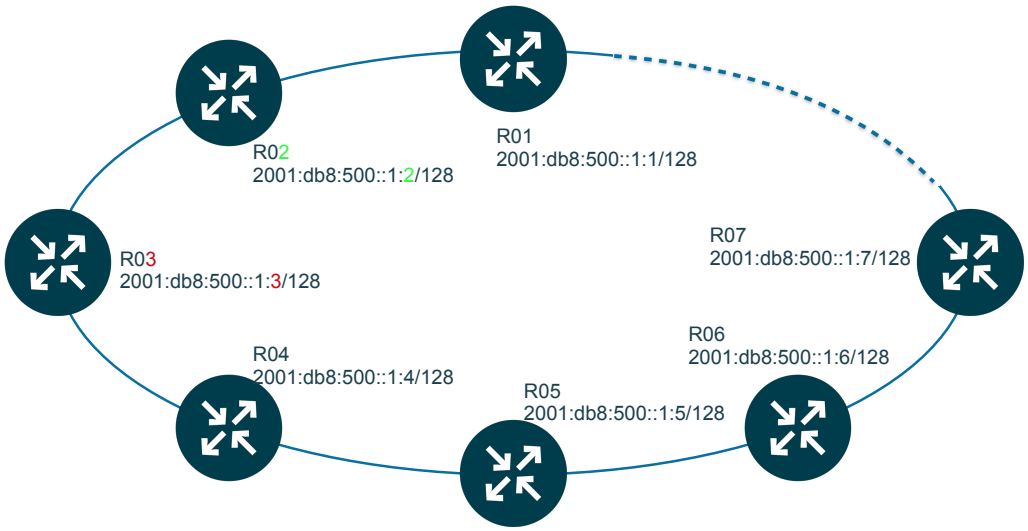


Figure 1: Network Setup

Figure 1 shows the network topology for this experiment. All devices are connected in a ring like structure, each device has two neighbors. IS-IS is configured on the interfaces.

3 Slides

Setup IS-IS

- IS-IS means “Intermediate System – Intermediate System”
- IS-IS is the last leftover from the so-called OSI-protocols
- It runs not on top of IPv4 or IPv6, but directly on top of Layer 2 (Ethernet).

```
router isis myisis
 net 49.0000.0000.0000.00XX.00

interface loopback0
 ip router isis myisis
 ipv6 router isis myisis
interface eth1
 ip router isis myisis
 ipv6 router isis myisis
interface eth2
 ip router isis myisis
 ipv6 router isis myisis
```

- For *XX* use your router id (01, 02, ...)
- Instead of "*myisis*" you can use anything. Just be sure it’s always the same.

Show commands:

- show ip route isis
- show ipv6 route isis
- show isis summary
- show isis interface
- show isis neighbor

4 Your Device

Please now connect to your device and check your IP addresses. The commands you need are *show running* or *show interface*:

5 Setup IS-IS

5.1 To set up IS-IS you need to:

- Start the IS-IS process
- Define and configure a router id. Format is *49.nnnn.nnnn.nnnn.nnnn.00*. Just set all "*n*" to zero except the last ones, which you set to your router's number. So configure "49.0000.0000.0000.00XX.00" with *XX* being your router number.
- Enable IS-IS on network interface where needed

5.2 The commands you need are:

show ip route isis shows you all IPv4 prefixes routed within IS-IS

show ipv6 route isis shows you all IPv6 prefixes routed within IS-IS

show isis gives you information about the IS-IS process

show isis interface shows details about each interface where IS-IS is running

show isis neighbor shows discovered neighbor routers which run IS-IS

Note that unlike with OSPF, the *show* commands do not include the term "ip". Thats because IS-IS does not run on top of IP, but runs directly on layer 2.

5.3 To configure IS-IS in config mode you need:

router isis <*name*> starts an IS-IS process with name <*name*>. The <*name*> is needed for reference later.

net <*very long router id*> needs to be configured manually. Format of the router id is 49.0000.0000.0000.xxxx.00. Instead of *xxxx* put in an unique number. For a more complete explanation see `http://www.dummies.com/programming/networking/juniper/is-is-network-protocol-basics/`

ip router isis <*name*> enables IS-IS for IPv4 on an interface. The <*name*> must be the same as in the process definition.

ipv6 router isis <*name*> enables IS-IS for IPv6 on an interface. Example:

```
interface eth1
  ip router isis myisis
  ipv6 router isis myisis
```

5.4 Tasks:

- Enable IS-IS on the right, left, and dummy interface for IPv4 and IPv6
- Check the routing table after all routers have IS-IS enabled. For this, do a *show ip route isis* and take note which loopback addresses are routed through your left and which through your right interface
- Do a *ping* to some of the other loopback addresses.
- Do a *traceroute* to the other loopback addresses and take note which way the packets go
- Shut down one of your interfaces (command *shutdown* in interface context in config mode), do the same traceroutes again. Has anything changed?
- Unshut (command: *no shutdown*) the same interface and try again.
- Do all a *show ip route isis*, the one of the participants shuts down one interface. Do all the *show ip route isis* again and note what has changed.

6 Solution

6.1 Solution for FRRouting

```
  router isis myisis
    net 49.0000.0000.0000.00XX.00

  interface loopback0
    ip router isis myisis
    ipv6 router isis myisis

  interface eth1
    ip router isis myisis
    ipv6 router isis myisis

  interface eth2
    ip router isis myisis
    ipv6 router isis myisis
```

Instead of *XX* use your routers id (you can use anything as long as it is unique within your network). Instead of *myisis* you can use any name for your IS-IS process.

6.2 Solution for Juniper

```
interfaces {
  em0 {
    unit 0 {
      family iso;
    }
  }
  em1 {
    unit 0 {
      family iso;
    }
  }
  lo0 {
    unit 0 {
      family iso {
        address 49.0000.0000.0000.00XX.00;
      }
    }
  }
}
protocols {
  isis {
        interface em0.0;
        interface em1.0;
        interface lo0.0;
    }
}
```

6.3 Solution for Mikrotik

Mikrotik does not support IS-IS.